CLAIMS

What is claimed is:

1. An apparatus comprising:

a cellular map of cellular communication cells in a geographic area;

a road map of vehicular roads in substantially the same geographic area; and

a traffic flow analyzer coupled to the cellular map and the road map to determine vehicular traffic in at least one part of the geographic area.

2. The apparatus of claim 1 wherein the at least one part of the geographic area comprises at least one cell of the cellular communication cells.

3. The apparatus of claim 1 wherein the at least one part of the geographic area is expressed in geographic terms including a reference to at least one of the vehicular roads.

4. The apparatus of claim 1 further comprising:

means for determining a delta over time in occupancy data for at least one cell of the cellular communication cells.

5. The apparatus of claim 1 further comprising:

a communication link for transmitting information concerning the vehicular traffic.

6. The apparatus of claim 5 wherein the communication link comprises:

a link to cellular devices which are coupled to the cellular communication cells.

7. The apparatus of claim 5 wherein the communication link comprises:

means for transmitting the information onto the internet.

8. The apparatus of claim 1 further comprising:

a processor coupled to the traffic flow analyzer.

9. The apparatus of claim 1 further comprising:

a map overlay mechanism for correlating the cellular map and the road map.

10. A cellular communication device for communicating with a cellular system, the cellular communication device comprising:

a receiver to receive communications from the cellular system;

a transmitter to transmit communications to the cellular system;

map storage to store a map; and

an analyzer coupled to the receiver to receive cell occupancy data from the cellular system and to the storage to access the map to determine traffic in at least one cell of the cellular system according to the occupancy data and the map.

11. The cellular communication device of claim 10 further comprising:

means for requesting the cell occupancy data; and

storage to store the cell occupancy data.

12. The cellular communication device of claim 10 wherein:

the cellular communication device further comprises data storage to store the occupancy data;

the occupancy data includes first occupancy data and second occupancy data for the at least one cell; and

the analyzer determines traffic according to a delta between the first occupancy data and the second occupancy data.

13. The cellular communication device of claim 12 further comprising:

an overlay mechanism for geographically correlating a cell map and a road map in the map storage.

14. The cellular communication device of claim 13 wherein the traffic includes vehicular traffic and the cellular communication device further comprising:

a display for outputting information depicting the vehicular traffic.

15. The cellular communication device of claim 12 further comprising:

a zoom control.

16. The cellular communication device of claim 12 further comprising:

means for updating the map storage to store a new map received via the receiver.

17. A cellular communication system providing cellular communication to an area including a plurality of cells, the cellular communication system comprising:

first storage to store a cell map;

second storage to store cell occupancy data;

means for detecting and analyzing a change in the occupancy data of a first cell; and

means for changing a functionality of the cellular system's communications in at least one cell of the plurality of cells.

18. The cellular communication system of claim 15 wherein:

the means for detecting and analyzing a change in the occupancy data of the first cell detects a volume of traffic moving into or out of the first cell; and

the means for changing alters an amount of bandwidth allocated to a second cell which is near the first cell.

19. The cellular communication system of claim 18 wherein the traffic includes vehicular traffic traveling on roads that connect various of the cells and wherein the cellular communication system further comprises:

third storage to store a road map of the roads; and

a map overlay mechanism to correlate the road map with the cell map.

20. The cellular communication system of claim 19 further comprising:

means for providing, to cellular devices in communication with the cellular communication system, information concerning the vehicular traffic flow.

21. A method comprising:

determining a delta in occupancy data of at least one cell of a cellular communication system; and

determining, according to the delta in occupancy data, spatial movement of cellular devices in communication with the cellular communication system.

22. The method of claim 21 wherein the spatial movement comprises substantially planar movement of vehicular traffic.

23. The method of claim 21 wherein the spatial movement comprises three-dimensional movement of aeronautical traffic.

24. The method of claim 21 further comprising:
determining the delta according to a proper subset of available occupancy data for a cell.

25. The method of claim 24 further comprising:
randomly selecting the proper subset.

26. The method of claim 24 further comprising:
algorithmically selecting the proper subset.

27. The method of claim 21 further comprising:
publishing information representing the spatial movement.

28. The method of claim 27 wherein the publishing comprises:
transmitting the information to cellular devices in communication with the cellular communication system.

29. The method of claim 28 wherein the information comprises:
a graphical depiction of traffic on roads in the cell occupied by, and neighboring cells of, at least one cellular device.

30. The method of claim 28 wherein the information comprises:
travel routing advice.

31. The method of claim 27 further comprising:
selecting, to receive the transmitted information, substantially only those cellular devices which are subscribed to receive the transmitted information.

32. The method of claim 27 wherein the publishing comprises:
sending the information to an entity which is not a cellular device in communication with the cellular communication system.

33. The method of claim 32 wherein the entity comprises at least one of a police department, a department of transportation, a news bureau, a radio station, a television station, a server computer, and an internet website.

34. The method of claim 21 further comprising:

constructing a set of vectors representing vehicular traffic between cells of the cellular communication system.

35. The method of claim 34 further comprising:

constructing a linear boundary map describing where vehicular roads connect cells.

36. The method of claim 21 further comprising:

in response to at least one of the delta and the spatial movement, adjusting functionality of the cellular communication system.

37. The method of claim 36 wherein the adjusting functionality comprises:

increasing capacity of a cell.

38. The method of claim 37 further comprising:

in response to at least one of the delta and the spatial movement, predicting a future change in occupancy of a cell; and

the cell whose capacity is increased is the cell whose occupancy is predicted to have a future change.

39. A method of operation of a traffic estimation system connected to a cellular communication system which is in communication with a plurality of cellular devices, the method comprising:

receiving cell occupancy data from the cellular communication system;

determining which of the cellular devices represented by the cell occupancy data are moving between cells of the cellular communication system;

determining which cells the moving cellular devices are moving between; and

converting the moved-between cell determination into a vehicular roadway representation indicating which roads the moving vehicles are likely to be driving on.

40. The method of claim 39 further comprising:

ignoring cellular devices which are not traveling between cells for a sufficient time such that it is likely that they are stationary or only driving short distances within their respective cells.

41. The method of claim 39 further comprising:
analyzing only a proper subset of available cell occupancy data; and
extrapolating from the resulting analysis to achieve an estimated result for a larger set of occupancy data.

42. The method of claim 41 further comprising:
randomly selecting the proper subset.

43. The method of claim 41 further comprising:
algorithmically selecting the proper subset.

44. The method of claim 39 further comprising:
publishing information representing the vehicular roadway representation.

45. The method of claim 44 wherein the publishing comprises:
transmitting the information to the cellular communication system.

46. The method of claim 44 wherein the publishing comprises:
transmitting the information to at least one of the cellular devices.

47. The method of claim 46 further comprising:
selecting to receive the transmitted information substantially only those cellular devices which are subscribed to receive the transmitted information.

48. The method of claim 39 further comprising:
performing system validation analysis upon anonymized individual cellular devices.

49. A method comprising:
receiving a request for an area traffic analysis in a specified area;
categorizing cellular devices in the specified area;
filtering out cellular devices not recently in other areas;
capturing cellular devices recently arrived from other areas;

eliminating cellular devices departing to other areas;

reconciling a result with results from nearby areas to produce a result;

providing the result to an entity from which the request was received.

50. The method of claim 49 further comprising:

producing a cell-based vector set; and

converting the vector set into road map format data.

51. The method of claim 50 further comprising:

making a qualitative interpretation of the road map format data as a traffic flow estimation.

52. An article of manufacture comprising:

a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the method of claim 21.

53. The article of manufacture of claim 52 wherein the machine-accessible medium further including data that, when accessed by the machine, cause the machine to further perform the method of claim 24.

54. An article of manufacture comprising:

a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the method of claim 39.

55. The article of manufacture of claim 54 wherein the machine-accessible medium further including data that, when accessed by the machine, cause the machine to further perform the method of claim 41.

56. An article of manufacture comprising:

a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the method of claim 49.

57. The article of manufacture of claim 56 wherein the machine-accessible medium further including data that, when accessed by the machine, cause the machine to further perform the method of claim 51.